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Letter to the Editor

Response to “Significance of descriptive statistics in forensic anthropology research”, published in the November 2013 issue of the Journal of Forensic and Legal Medicine



Dear Sir,

The authors of a recent letter¹ have pointed to the omission of descriptive statistics in a paper authored by us in early 2013.² However, we are surprised that they were “astonished” by the omission,¹ particularly since several of the “basic details” of descriptive statistics which they allude to (standard error, inter-quartile range, results of a normality test) are missing in a research paper on stature estimation co-authored by one of them.³ Now, agreed that descriptive statistics are able to provide some useful information such as the measures of central tendency and measures of dispersion of the study sample. Nevertheless, descriptive statistics perhaps take on greater importance in studies whose objective is to categorise or differentiate two groups (e.g., sex differentiation) where the mean and standard deviations of various parameters in each of the groups can prove highly valuable to researchers.

But in the case of predicting a dependent variable (e.g., stature, age) based on corresponding independent variable(s) (e.g., tooth dimensions; tooth mineralisation) using statistical analyses such as least squares regression or ridge regression, the statistical indicators mentioned by the authors may assume lower levels of importance. The degree of correlation (expressed by correlation coefficients) and its level of significance, as well as error rate in predicting the dependent variable (e.g., the Standard Error of the Estimate for the sample; the Mean Absolute Difference) appear to be the more commonly reported statistical measures.^{3–5} This is also our experience of publishing research related to regression analysis in leading forensic journals, including the Journal of Forensic and Legal Medicine,^{6–9} wherein the peer review process barely noticed the omission of descriptive statistics — possibly an indication of its diminished practical importance in such studies.

What is ironic though is that, in their attempt to point out the statistical ‘deficiencies’ in our paper,² the authors of the letter¹ have taken a few statistical missteps of their own. They seem to believe that descriptive statistics is the panacea for gauging potential bilateral variation as well as sex differences in tooth dimensions. This is evident in their statement, “It would have been interesting to note if the size of teeth varied significantly between sides. Basic descriptive statistics would have given a reasonable idea to these questions.” The authors seem to have forgotten a basic

lesson in statistics — that descriptive statistics aims to summarise a sample, and the appropriate statistical analysis to determine whether ‘significant’ differences exist between the right and left sides of the dentition are inferential statistics such as tests of differences (e.g., Paired Samples *t*-test). Also, whether the correlation to stature of the teeth on the two sides varied was less of a concern since the ridge regression attempted to determine the correlation of the dentition, as a whole (i.e., as a unit), to stature.

Next, the authors deviate from their comment concerning the ‘significance’ (sic) of descriptive data and begin to exhort the importance of sex-specific data and how descriptive statistics can, again, assist in providing “the answers to these questions” — questions on whether there are differences between males and females for stature and tooth dimensions. Of course, differences are expected to exist between the male and female dentitions (as well as male–female stature). However, researchers would be keener to apply, yet again, tests of differences (e.g., Independent Samples *t*-test) since descriptive statistics do not give the *statistical significance* of the difference.

Moreover, we note the continual use of the word “significance” by the authors of the letter (in the title and two other instances in the text); perhaps they are unaware that this constitutes non-technical usage of a technical term in statistics and should have been avoided. Lastly, the authors’ comment that combining male and female data “can be the reason for lower levels of significance and higher errors in estimate” contravenes the basic tenets of research, which is the keen observation of and logical deduction from facts. We are astonished that the authors did not think it worthy of contacting us first to verify unpublished results at our disposal before attempting an inference. As it turns out, assessing the sexes separately continued the trend of low correlation ($r \leq 0.40$) which was mostly statistically insignificant.

Yours sincerely,

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References

1. Kanchan T, Krishan K. Significance of descriptive statistics in forensic anthropology research. *J Forensic Leg Med* 2013;**20**(8):1151.
2. Prabhu S, Acharya AB, Muddapur MV. Are teeth useful in estimating stature? *J Forensic Leg Med* 2013;**20**(5):460–4.
3. Rao PP, Sowmya J, Yoganarasimha K, Menezes RG, Kanchan T, Aswinidutt R. Estimation of stature from cranial sutures in a South Indian male population. *Int J Leg Med* 2009;**123**(3):271–6.
4. Spalding KL, Buchholz BA, Bergman LE, Druid H, Frisén J. Age written in teeth by nuclear tests. *Nature* 2005;**437**:333–4.
5. Cameriere R, Ferrante L, Liversidge HM, Prieto JL, Brkic H. Accuracy of age estimation in children using radiograph of developing teeth. *Forensic Sci Int* 2008;**176**:173–7.
6. Acharya AB, Vimi S. Effectiveness of Bang and Ramm's formulae in age assessment of Indians from dentin translucency length. *Int J Leg Med* 2009;**123**(6):483–8.
7. Acharya AB. Age estimation in Indians using Demirjian's 8-teeth method. *J Forensic Sci* 2011;**56**(1):124–7.
8. Acharya AB, Kumar KK. Age estimation in Indians from extracted unsectioned teeth. *Forensic Sci Int* 2011;**212**:275.e1–5.
9. Babshet M, Acharya AB, Naikmasur VG. Age estimation from pulp/tooth area ratio (PTR) in an Indian sample: a preliminary comparison of three mandibular teeth used alone and in combination. *J Forensic Leg Med* 2011;**18**:350–4.

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